

USDA  
NATURAL RESOURCES  
CONSERVATION SERVICE  
MARYLAND  
CONSERVATION  
PRACTICE STANDARD  
  
PRESCRIBED GRAZING  
  
CODE 528-A  
(Reported by Ac.)

**DEFINITION**

The controlled harvest of vegetation with grazing or browsing animals, managed with the intent to achieve a specified objective.

**PURPOSES**

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Improve or maintain the health and vigor of selected plants and to maintain a stable and desired plant community.
- Provide or maintain food, cover, and shelter for animals of concern.
- Improve or maintain animal health and productivity.
- Maintain or improve water quality and quantity.
- Reduce accelerated soil erosion and maintain or improve soil condition for sustainability of the resource.

**CONDITIONS WHERE PRACTICE  
APPLIES**

This practice may be applied on all lands where grazing and/or browsing animals are managed.

**CONSIDERATIONS**

- Prescribed grazing should consider the needs of other enterprises utilizing the same land such as wildlife and recreational uses.
- Consider animal husbandry requirements which may affect the design of the grazing system.
- Natural or artificial shelter may be needed to protect animals from adverse weather conditions.

**CRITERIA**

**General Criteria Applicable To All  
Purposes**

- Removal of forage will be in accordance with production limitations and plant sensitivities.
- Enough vegetative cover should be maintained to prevent erosion.
- Frequency and intensity of grazing should be managed to promote ecological and economical stable plant communities, which meet landowner objectives.
- Frequency and intensity of grazing should be managed to protect streambanks from erosion and maintain or improve riparian areas.

**Additional Criteria To Improve The  
Health And Vigor Of Selected Plants**

- Duration and intensity of grazing should be based on desired plant health and expected productivity of the main forage species. The recovery period is a measure of the time it will take a plant species to regrow to a grazable height. The recovery period of the forage can be determined by dividing the forage target by the average growth rate during the recovery period.

$$\begin{array}{lcl} \text{Recovery} & & \text{Average forage target in \#DM/acre} \\ \text{period in} & = & \text{Average growth rate of forage for} \\ \text{days} & & \text{period (\#DM/AC/Day)} \end{array}$$

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

\*DM is dry matter.

The recovery period will vary significantly over the growing season. For cool season species, recovery will be faster in the spring. While for warm season species, recovery will be faster in mid to late summer. Recovery period days provide valuable information for overall grazing schedules, but they should not be used as the basis for rotating livestock. In management intensive systems, livestock should be rotated into paddocks based on the residual heights. See Tables 1 & 2 for guidance on grazing management.

### **Additional Criteria To Maintain Or Improve Animal Health And Productivity**

Pastured livestock shall not be emaciated, denied access to water, nor left untreated with traumatic wounds or diseases that threaten the life of the animal. Care and handling shall be done in a humane manner.

**Stocking Rates** - Allocate land by following this general formula:

$$\begin{array}{l} \text{Avg. forage} \\ \text{growth} \\ \text{Rate during} \\ \text{grazing cycle} \\ \text{(\#DM/Day)} \end{array} \times \begin{array}{l} \text{Days in} \\ \text{grazing} \\ \text{Cycle}^1/ \end{array} \times \begin{array}{l} \% \text{ Forage} \\ \text{Utilized} \end{array} = \begin{array}{l} \text{Livestock} \\ \text{forage} \\ \text{demand} \end{array}$$

$$\text{Livestock demand} = \text{Animal Unit Days}^2 \times 26 \text{ \# DM/Day}^3$$

1. Grazing cycle = grazing period plus recovery period
2. Animal Unit Day = 1000#, unconfined, nonlactating, mature cow for 24 hours needed to maintain body weight, see Appendix A.
3. For Lactating dairy cows, use 30# DM/Day.

When supplementing pasture forage with other feed sources, modify the general equation to decrease pasture forage demand by the amount of supplemental feed consumed.

**Available Forage** - The consumable forage in pounds of dry matter per acre. Available forage is calculated by taking the difference

between the allowable minimum plant height and the plant height achieved before grazing.

For lactating dairy cows, provide a minimum of 1500 pounds of available forage dry matter per acre at the beginning of a grazing period and not less than 1000 pounds of DM per acre during length of stocking.

For beef, swine, horses and non-lactating dairy animals, provide a minimum of 1000 pounds of available forage dry matter per acre at the beginning of a grazing period and not less than 500 pounds of DM per acre during length of stocking.

For sheep, goats and poultry, provide a minimum of 750 pounds of available forage dry matter per acre at the beginning of the grazing period and not less than the limits set for the plant species resource purpose.

To initialize spring grazing or fall clean-up, the above criteria for available forage dry matter can be relaxed provided DM intake is maintained.

**Feed Supplements** - Balance feed rations with pasture forage to provide the energy, fiber, by-pass protein, vitamins, and minerals necessary to meet the production objectives of the producer and nutritional requirements of the livestock species and age.

**Shade** - Provide animals with access to natural or artificial shade on days when relative humidity levels exceed 50 percent and air temperatures exceed 90° F. Take into consideration the breed and color of animals. Darker colored animals may show more heat stress signs than lighter coated animals.

**Shelter** - Provide livestock wintered on pasture access to natural or artificial shelter that keeps the wind chill factor within 5°F of ambient air temperature.

**Sanitation** - When using a pasture rotation method to break some soil borne parasite cycles, follow the time limits below:

<b><u>SPECIES</u></b>	<b><u>REMOVAL TIME</u></b>
Cattle	1 Year
Horses	1 Year
Sheep	1 Year

Swine	1 Year
Poultry	2 Years

**Endophytes** - Endophyte infected Tall Fescue is not recommended for brood mares or lactating dairy cows. Test fields to know level of infestation. Reduce the effects of toxicity by providing an alternative forage.

**Bloat** - In pure legume fields where ruminant animals are sensitive to bloat, consider the following:

- Provide poloxalene free choice prior to first stocking per season.
- To condition animals, feed livestock prior to pasturing for the first few days.
- Allow livestock to graze legumes only after water from dew, rain or irrigation has evaporated from foliage and dry hay is made available as free choice in the field.

**Poisonous Plants** - Scout for poisonous plants such as nightshades and wilting cherry branches and remove if found in levels to cause illness or death. Consult "100 Poisonous Plants of Maryland", University of Maryland, CES Bulletin #314.

**Indole Alkaloids** - Avoid pasturing sheep on reed canary grass having average concentrations of total indole alkaloids above 0.2% by dry weight. Test existing stands to determine alkaloid levels.

**Grass Tetany** - Grass tetany can be a problem where a magnesium deficiency occurs, mostly in the spring of the year. Treat by providing free choice blocks or feed additives to maintain blood serum levels of magnesium above 20 ppm. Pastures can be fertilized to prevent tetany.

**Cyanogenic forages** - Cyanogenic forages (Trefoil, White Clover, Johnsongrass, Sorghum and Sudangrass) shall not be grazed when hydrogen cyanide content of the forage dry matter exceeds 200 ppm (drought or frost stressed plants). For Sudangrass or Sudan-sorghum crosses, refrain from grazing until plants are 24 inches tall. Plants should be

tested to determine their hydrogen cyanide level.

### **Additional Criteria To Maintain Or Improve Water Quality And Quantity**

Exclude livestock from streams, seep areas, ponds, and lakes by providing alternative watering sites. Stream crossings and limited access points are acceptable. Follow the conservation practice standards when constructing these facilities. If runoff from the area is likely to occur quickly, filter strips are recommended.

Locate areas of high animal concentration away from waterways, streams and lakes whenever possible.

Provide all livestock on pasture with free access to clean water. Water requirements may increase during long periods of temperatures at or above 90°F and humidity above 50%. The following are average daily water requirements for grazing livestock:

<b><u>SPECIES</u></b>	<b><u>GALLONS/HEAD/DAY</u></b>
Dairy cows < 18,000# milk	25
Dairy cows > 18,000# milk	35
Dry cows or heifers	15
Calves	7
Beef brood cows	12
Steers in feedlot	18
Dairy, goats or sheep	2
Goats or sheep	1
Horses, mules or donkeys	12
Swine, brood sows	6
Swine, finishing	4
Laying hens	.09
Broilers	.06
Turkeys, 15-19 weeks old	.17
Ducks or geese, 15 - 19 weeks old	.22

To encourage even grazing pressure, the watering facilities for cattle, horses, sheep and goats should be located according to the recommendations below. Distances may vary due to economic and ecological constraints:

<b><u>Ave. Field Slope</u></b>	<b><u>Maximum Distance to Water</u></b>
>15%	750 feet
8 - 15%	1100 feet
<8%	1420 feet

**Additional Criteria To Reduce Soil Erosion And Maintain Or Enrich Soil Condition**

Maintain ground cover at or above 80 % at all times during the grazing season.

When grazing crop residue, monitor ground cover during the grazing period and remove animals when residue mass approaches the minimum amount needed to keep soil loss within tolerance and maintain soil conditions.

Pasture fencing layouts shall provide laneways that are least prone to livestock trail erosion and provide protection to sensitive areas, such as wetlands. Refer to conservation practice standard ANIMAL TRAILS AND WALKWAYS (575) for design criteria.

Refrain from grazing poorly drained, and very poorly drained soils unless they are artificially drained when high water table occurs as per soil and water features of the soil survey. These areas can be grazed during wet conditions for short durations

When managing multi-species grazing systems, utilize first and second grazers to improve efficiency. High maintenance animals should be followed by low maintenance animals.

Renovation of pastures may be necessary when existing forages are not producing enough forage to meet the demands of the grazing animals. See PASTURE AND HAYLAND PLANTING STANDARD (512).

**OPERATION AND MAINTENANCE**

Repair or replace fences incapable of controlling livestock to the level required by the grazing method.

Adjust available forage or livestock amounts if stock rates endanger the productivity of the forage species.

Use a feedlot or sacrifice area when periods of drought threaten the forage species. Locate sacrifice areas in the most environmentally sound fields to control erosion due to overgrazing.

Apply lime and fertilizer when soil tests indicate soil pH and nutrient levels are lower than needed to meet targeted forage yield goals as per stocking rates. See NUTRIENT MANAGEMENT STANDARD (590) and PASTURE AND HAYLAND PLANTING STANDARD (512).

Mow pastures as needed to trigger vegetative regrowth and/or control weeds.

Remove or eliminate any hazards, such as loose wire, high walls, heavy limbs, steep slopes, or unsafe water bodies from grazing units.

Drag pastures as needed to provide more even distribution of nutrients.

## **SUPPORTING DOCUMENTATION**

Record and maintain the following data for prescribed grazing and include it in the case file:

For all purposes:

- Map showing pasture layout, acres, fences, lanes, shade, shelter, watering areas, and other components of the grazing system. Include the main forage species in each grazable unit.

In addition for Purpose 1 and 3:

- A livestock/forage balance sheet which inventories forage supply and animal classes, types and amounts. This may be done using a computer program or worksheet.

In addition for Purpose 3:

- Estimate of supplemental feed requirements. This may be listed on the forage balance sheet.

## **REFERENCES**

Approved Practices In Pasture Management, Graffis et al., Interstate Printers & Publishers, Inc., 1985

Basic Animal Nutrition And Feeding, Church & Pond, O&B Books, 1974.

Grazing Management, John Valentine, Academic Press, 1990.

Prescribed Grazing Management To Improve Pasture Productivity In New York, D. Emmick, SCS, and D. Fox, Cornell University, 1993

Profitable Pastures, Cooper, Maryland USDA SCS, 1991.

Terminology For Grazing Lands And Grazing Animals, Pocahontas Press, Inc., 1991.

The Agronomy Guide, 1995-1996, Penn State University, 1994.

Water Quality For Livestock And Poultry, Machmeier, University of Minnesota, 1984

100 Poisonous Plants of Maryland, University of Maryland, Bulletin 314, 1985-86.

**TABLE 1**  
**RECOMMENDED RESIDUAL HEIGHTS**  
**UNDER ROTATIONAL GRAZING SYSTEMS**

This table provides a guideline on when to start and stop grazing established stands. Rotational systems include all systems that provide a recovery period. Recovery periods will vary depending on site conditions and seasonal changes.

SPECIES	GRAZING PERIOD	HEIGHT IN INCHES	
		TO BEGIN	TO STOP
Alfalfa	First	6 - bud	2 - 3
	Second +	4	2 - 3
	Last	4	3
Bermudagrass	First	4	1
	Second +	3	1
	Last	3	2
Bluegrass	First	4 - 5	1 - 2
	Second +	4	1 - 2
	Last	4	2
Big Bluestem	First	12 - 16	6
	Second +	12	6
	Last	12	9
Birdsfoot Trefoil Upright type  Prostrate type	First	4 - 7	2 - 3
	Second +	4	2 - 3
	Last	4	3
	First	4 - 5	1 - 2
	Second +	4	1 - 2
	Last	4	3
Caucasian Bluestem	First	8 - 12	4
	Second +	8	4
	Last	8	6
Clover Alsike, Red & Common White  Ladino	First	4 - 7	2 - 3
	Second +	4	2 - 3
	Last	4	3
	First	8 - 10	3
	Second +	8	3
	Last	8	3
Eastern Gamagrass	First	15 - 18	6 - 8
	Second +	15	6 - 8
	Last	15	9 - 12
Fescue	First	6 - 8	2 - 3
	Second +	6	2 - 3
	Last	6	3
Indiangrass	First	12 - 16	6
	Second +	12	6
	Last	12	9

SPECIES	GRAZING PERIOD	HEIGHT IN INCHES	
		TO BEGIN	TO STOP
Kale	First Second/Last	12 - 20 (90 days) 12 - 16	3
Lespedezas  Annual   Perennial	First	½ bloom	3
	Second +	½ bloom	3
	Last	½ bloom	3
	First	12	3
	Second +	12	3
	Last	12	3
Little Bluestem	First	12	4 - 6
	Second +	12	4 - 6
	Last	12	6 - 9
Orchardgrass	First	6 - 8	3
	Second +	6	3
	Last	6	3
Rape**	First Second/Last	16 - 20 (60 days) 12 - 16	6
Reed Canarygrass	First	Before jointing	4
	Second +	Basal sprouts	4
	Last	New basal sprouts	5
Smooth Brome	First	Medium head	3
	Second +	Basal sprouts	3
	Last	New basal sprouts	4
Switchgrass	First	12 - 16	6
	Second +	12	6
	Last	12	9
Timothy	First	Before jointing	3
	Second	Basal sprouts	3
	Last	New basal sprouts	3 - 4
Turnips***	First	16 - 20 (60 days)	Leave roots
	Second/Last	12 - 16	
Winter Small Grains			3

- \* To maintain stands, allow Lespedezas to grow to maturity and produce seed every 3 years.
- \*\* Rape should be mature before grazing. Immature rape can be high in nitrate. Mature leaves can be identified by their bluish tint.
- \*\*\* Turnips may cause an off flavor in milk.

**TABLE 2**  
**RECOMMENDED RESIDUAL HEIGHTS UNDER CONTINUOUS GRAZING**  
**SYSTEMS**

This table provides a guideline on managing established stands under continuous grazing systems.

<b>SPECIES</b>	<b>HEIGHT IN INCHES AT FIRST GRAZING</b>	<b>AVERAGE HEIGHT OF PASTURE</b>
Bermudagrass	4	2
Bluegrass	4 - 5	2 - 3
Clover		
Alsike, Red & Common White	4 - 7	3
Ladino	8 - 10	3 - 4
Fescue	6 - 8	3 - 4
Orchardgrass	6 - 8	4 - 5
Smooth Bromeagrass	Before jointing	3 - 4
Timothy	Before jointing	
Winter Small Grains	8 - 12	3 - 6

The following species tend to become depleted in stands under continuous grazing systems where no recovery period is used. Therefore, these species are not recommended for use in continuous systems

Alfalfa (including grazing types)

Big Bluestem

Birdsfoot Trefoil (upright & prostrate types)

Caucasian Bluestem

Eastern Gamagrass

Indiangrass

Kale

Lespedeza (annual and perennial)

Little Bluestem

Rape

Reed Canarygrass

Switchgrass

Turnips